ROCKY MOUNTAIN ARSENAL NATIONAL PRIORITIES LIST SITE

RESPONSIVENESS SUMMARY FOR PARTIAL DELETION OF

THE INTERNAL PARCEL

JULY 2006

U.S. Environmental Protection Agency, Region 8

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A. OVERVIEW

The Rocky Mountain Arsenal National Priorities List (RMA/NPL) Site is located in southern Adams County, Colorado and is comprised of two operable units (OU), the On-Post OU and the Off-Post OU. The On-Post OU of the RMA/NPL Site originally encompassed 26.6 square miles approximately eight miles northeast of downtown Denver, Colorado. In 2003, 1.5 square miles (940 acres) of land on the western portion of the site known as the Western Tier Parcel (WTP) were deleted from the NPL, and in 2004, an additional 7.9 square miles (5,053 acres) of land along the perimeter of the site known as the Selected Perimeter Area (SPA) and Surface Deletion Area (SDA) were deleted from the NPL. The On-Post OU now encompasses 17.2 square miles (11,007 acres). The Off-Post OU addresses contamination north and northwest of the RMA-proper boundaries. The Internal Parcel comprises approximately 11.5 square miles (7,396 acres) of the On-Post OU of the RMA/NPL Site in Commerce City, Colorado.

A remedial investigation (RI) for the On-Post OU completed in January 1992 studied each of the environmental media at the RMA/NPL Site including soil, sediment, structures, water, air, and biota. The *Record of Decision for the On-Post Operable Unit* (*ROD*) was signed on June 11, 1996 and specified the remedial actions for soil, structures, and groundwater. Based upon evidence gathered during the RI, twelve separate soil cleanup projects were identified within the Internal Parcel. In addition, 183 structures within the Internal Parcel were slated for demolition. Eleven groundwater contaminant plumes were identified below the western portion of the Internal Parcel and are being remediated through continued operation of groundwater treatment systems to remove the contaminants.

Remedial actions have been completed within the Internal Parcel for all surface media (soil, surface water, sediment), structures, and groundwater. The Internal Parcel includes

groundwater that is east of E Street with the exception of a small area in the northwest corner of Section 6. The rest of the On-Post OU, including groundwater below RMA that is west of E Street and the small area in the northwest corner of Section 6, and the Off-Post OU will remain on the NPL.

The 1992 *Rocky Mountain Arsenal National Wildlife Refuge Act* (*Refuge Act*) (Public Law 102-402) designates most of the On-Post OU of the RMA/NPL Site to become a national wildlife refuge once the cleanup is completed. Institutional controls (ICs) were incorporated into the *ROD* and apply to all RMA property after deletion.

B. BACKGROUND

On April 26, 2006, the U.S. Environmental Protection Agency (EPA) published a Notice of Intent for Partial Deletion (NOIDp) in the *Federal Register* (71 FR 24627) and in local newspapers proposing the deletion of the Internal Parcel from the RMA/NPL Site. The RMA Site-Specific Advisory Board (SSAB) requested additional time to adequately review the documentation. The public comment period for the NOIDp was extended through June 26, 2006 (71 FR 29880).

The NOIDp indicated that the Internal Parcel consisted of 7,399 acres of the On-Post OU in the interior of the RMA/NPL Site in Commerce City, Colorado. The Internal Parcel has been revised to 7,396 acres (11.5 square miles) to exclude a small 3-acre area corresponding to the Rail Yard Treatment System. The Rail Yard Treatment System is excluded from the Internal Parcel due to a delay in developing the Interim Construction Completion Report (CCR).

The EPA bases the deletion of the Internal Parcel of the RMA/NPL Site on the determinations by the EPA and the State of Colorado, through the Colorado Department of Public Health and Environment (CDPHE), that all appropriate actions under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) have been implemented to protect human health, welfare, and the environment and that

no further response action by responsible parties is appropriate. A public meeting to discuss the proposed partial deletion of the Internal Parcel was held on May 9, 2006. This Responsiveness Summary is in response to comments received during the public comment period, and is comprised of the following sections:

Section C: Comments Specific to the Proposed Partial Deletion of the Internal Parcel, and EPA's Responses

Section D: Additional Comments and Questions Received Regarding the RMA/NPL Site

Attachment A: Community Involvement Activities Conducted at the RMA/NPL Site Pertinent to the Internal Parcel Area

Attachment B: Comments Received Regarding Partial Deletion of the Internal Parcel Area

Attachment C: List of Acronyms and Abbreviations

C. COMMENTS SPECIFIC TO THE PROPOSED PARTIAL DELETION OF THE INTERNAL PARCEL, AND EPA'S RESPONSES

The public comment period for the proposed partial deletion of the Internal Parcel was open from April 26, 2006, to June 26, 2006. Questions received during a public meeting conducted on May 9, 2006, were primarily focused on characterization and biomonitoring. EPA received comment letters from ninety-four organizations/entities and individuals. Authors of eighty-eight of the letters voiced their support for proceeding with the partial deletions based upon their confidence in the thoroughness of the cleanup activities conducted by the Department of the Army (Army) and Shell Oil Company (Shell). Authors of six letters were opposed to the proposed partial deletion of the Internal Parcel. One of these letters, received from the SSAB, requested postponement of the deletion, stating that the 60-day review time was insufficient to review and resolve questions regarding characterization of the eastern portion of the Internal Parcel and their perception of unnecessary risk posed by deletion of the western portion of the Internal Parcel. In addition, several commenters questioned what they termed the piecemeal

approach to the Internal Parcel deletion. The primary comments in opposition to the proposed deletion are addressed beginning with Comment 2 of this section.

Comment Letters in Support of Deletion

(1) Eighty-eight letters supporting deletion of the Internal Parcel cited their support of the proposed deletion based upon their confidence in the thoroughness of the cleanup activities conducted by the Army and Shell. Letters supporting deletion were received from the RMA Wildlife Society, Audubon Colorado, Environmental Learning for Kids, and individuals, as well as a resolution from the Commerce City Council.

EPA Response: EPA agrees that the RI and post-*ROD* studies conducted have adequately characterized areas of contamination within the Internal Parcel. Remedial actions have been completed within the Internal Parcel for all surface media (soil, surface water, sediment), structures, and groundwater. Therefore, these areas do not pose a threat to human health, welfare or the environment. The rest of the On-Post OU, including groundwater below RMA that is west of E Street and the small area in the northwest corner of Section 6, and the Off-Post OU will remain on the NPL. Therefore, EPA believes it is appropriate to delete the Internal Parcel.

Potential Risk

(2) The SSAB comments expressed a concern regarding the potential risk for emissions from bordering areas of active surface remediation or subsurface contamination drifting onto deleted property. The SSAB indicated that much of the land proposed for deletion is adjacent to ongoing or future clean-up activities, where moving or capping significant contamination has not yet been completed. The SSAB considered that just because specific soil sites have been remediated within a property section, it does not mean that all the risks to receptors have been addressed.

EPA Response: The soil cleanup projects remaining on the NPL site include excavation of four remaining contaminated soil areas, installation of a slurry wall, construction of five cover systems over consolidation and landfill areas, clearance of munitions and explosives of concern (MEC) at the final remaining munitions areas, and demolition of remaining structures.

EPA ensures that human health is protected from on-going remedial activities through effective control of project emissions, restricting visitor access, and implementation of the *Site-Wide Air Quality Monitoring Program Plan (SWAQMP*) (2006), including monitoring of air emissions. Project emissions on a given project are controlled through various mechanisms, which include limiting the open excavation area, the excavation rate, the hours of operation, the seasons of operation, the placement area open at the landfill, and the transportation rate (i.e., the number of trucks); the application of emission controls, such as foam, geomembrane, or clean dirt; and the application of water to suppress dust. The extent to which some or all of these controls are implemented at the start of remedial construction is based upon emissions estimated during the design. After start-up, project emission controls may be modified based upon actual emission data.

Currently, the U.S. Fish and Wildlife Service (USFWS) visitor program allows visitors to enter the RMA National Wildlife Refuge (Refuge) only through the south gate and follow a designated road to the Visitor Center. This route is clearly marked by gates which bar entry to adjacent roads. Once at the Visitor Center, participants attend formal programs led by USFWS staff and volunteers or use the hiking paths along and south of Lake Mary and Lake Ladora. The current *Public Use Plan* (2004) prohibits public access in areas north of the Visitor Center and Lakes area. USFWS staff and volunteers patrol the entry road, hiking paths, and other program areas to ensure visitors do not stray away from allowed visitor areas. This management approach to allow restricted access for visitors will not change as a result of deletion. Any future revisions to the *Public Use Plan* (2004) will be subject to public review. A *Memorandum of Understanding for the Management of Access on Certain Portions of Rocky Mountain Arsenal National Wildlife*

Refuge and Rocky Mountain Arsenal National Priorities List Site (*Memorandum of Understanding*) (2005) restricting access to the northwest part of the Internal Parcel was developed as an additional precautionary measure.

In addition, air emissions are measured at the current fenceline and near the Visitor Center to verify that potential risks to visitors and the nearby communities are minimized. These requirements to control air emissions within the levels specified by the *SWAQMP* remain in place irrespective of the deletion of the Internal Parcel and are designed to be protective of human health. Air emissions and the *SWAQMP* are discussed in greater detail in Comment 9.

Adequacy of the Technical Memo

(3) The SSAB comment letter stated that the *Technical Memorandum* only summarized the areas investigated and remedial activities that had been completed and that additional technical information should have been presented - specifically, data to demonstrate the thoroughness of the RI performed and protectiveness of the risk assessment conducted. In addition, the SSAB comment letter stated that the structure of the *Technical Memorandum* increased the difficulty to assess whether the required response actions to protect human health and the environment are supported by the project data.

EPA Response: The SSAB comment is correct that the intention of the *Final Technical Memorandum in Support of Partial Deletion of the Internal Parcel Deletion Area* (*Technical Memorandum*) (2006) was to summarize the areas investigated and remedial activities that had been completed within the Internal Parcel. The 116-page *Technical Memorandum* was developed to consolidate key information, including data, contained within numerous, multi-volume documents listed in a thirteen page reference section of the *Technical Memorandum*. The *Technical Memorandum* provides the public a summary of the information specific to the 11.5 square miles that comprise the Internal Parcel without having to sift through documents that also contain information for the remainder of the RMA/NPL Site.

The *Technical Memorandum* is not a document required by the *National Oil and Hazardous Substances Pollution Contingency Plan* (*NCP*) for deletion. The *Technical Memorandum* summarizes the myriad of information and documentation that is available in the Administrative Record pertaining to the area of the Internal Parcel. All the referenced documents, as well as the complete Administrative Record, are available for public review and can be accessed at the Joint Administrative Record Document Facility (JARDF), Rocky Mountain Arsenal, Building 129, Room 2024, Commerce City, Colorado 80022.

The summary of the RI/feasibility study (FS), *ROD*, remedial design, and remedial construction in the *Technical Memorandum* is organized consistent with the sequence in which these processes occur in CERCLA. By having the organization of the *Technical Memorandum* mirror the CERCLA process, it was intended to concisely and clearly provide, in a single document, the documentation that all required remedial activities have been completed.

EPA Docket and Allocated Review Time

(4) The SSAB expressed a concern that the references identified in documents contained in the docket were not available, but were needed to adequately evaluate the proposed deletion. The SSAB requested postponement of the proposed deletion so that their concerns could be developed and more formally presented.

EPA Response: In the EPA Docket, EPA provided those primary references identified in the *Technical Memorandum* that support deletion of the Internal Parcel. Providing secondary references would require placing a large percentage of the Administrative Record within the docket, which is not required, nor practical. EPA considered and allowed that the Administrative Record could be used to support deletion. The *Close-Out Procedures for National Priorities List Sites* (Office of Solid Waste and Emergency Response (OSWER) Directive 9320.2-09A-P, 2000) states:

> The Region prepares a deletion docket containing all pertinent information supporting the deletion recommendation. The deletion docket is not a continuation of the Administrative Record for the site. Documents in the Administrative Record can be referenced and do not have to be duplicated in the deletion docket (provided the Administrative Record is still available to the public).

In addition, one of EPA's goals for public involvement identified in EPA's *Public Involvement Policy* (2003) is to: "Solicit assistance from the public in understanding potential consequences of technical issues, identifying alternatives for further study, and selecting among the alternatives considered." Therefore, it is not EPA's expectation that the public will re-review documents from previous stages of the process within the comment period for this deletion; nor is it practical to provide a comment period that would allow independent verification of all the information and data from all preceding stages of the RMA project. However, the public is not limited only to reviewing the supporting information in the Administrative Record during the comment period for this deletion. The public can submit a comment at any time for consideration. Once a concern has been evaluated, a response regarding any actions to be taken will be developed and, if appropriate, placed in the Administrative Record.

Since 1988, each of the parties involved with the cleanup at the RMA has made extensive efforts to ensure that the public is kept informed on all aspects of the cleanup program. More than 100 fact sheets about topics ranging from historical information to site remediation have been developed and made available to the public. The designs for the remedial activities conducted within the Internal Parcel were generally provided to the public for a 30-day calendar review and comment period at both the 30 percent and 95 percent design completion stages. Each design was also presented for discussion at the regular meetings of the RMA Restoration Advisory Board, which is composed of community stakeholders, Regulatory Agencies, the Army, Shell, and the USFWS. No written comments regarding the implementation of the remedial activities or the proposed health and safety controls for each project were received. A summary of the community involvement activities pertinent to the Internal Parcel is included as Attachment A.

Five-Year Reviews

(5) Two commenters and the SSAB indicated that deletion should not occur until the Five-Year Review (FYR) for 2005 is completed and submitted for public review.

EPA Response. The Internal Parcel is part of the area subject to the FYR for 2005, a report which is still being developed. While once closely linked, site deletion has been separated from the FYR process since December 1991 (56 FR 66601). This is reflected in EPA's guidance document, *Close Out Procedures for National Priorities List Sites,* which indicates that a site can be deleted from the NPL without having the first FYR completed (EPA 2000).

In addition, the *Comprehensive Five-Year Review Guidance* (OSWER Directive 9355.7-03B-P)(2001) states:

> It is EPA's policy that the Five-Year Review requirement is independent of and unaffected by the deletion process. Consistent with the *NCP*, a site can be deleted or partially deleted from the NPL once the deletion criteria have been satisfied. If a site has been deleted or is in the process of being deleted, your Five-Year Review Report should address the status of any deletion action. Five-year reviews continue as needed after deletion.

This separation is a result of the two different purposes for deletion and the FYR within CERCLA. The deletion process is intended to require an assessment of whether the remedial activities that were required by the *ROD* have been completed. The FYR process is intended to answer questions about whether the remedy, completed or not, is performing as it was required and whether the remedy is protective in the way that the *ROD* intended it to be.

The 2000 FYR has been completed and the remedy was determined to be protective of human health and the environment. EPA's review of the Five-Year Review Report (FYRR) covering the period April 1, 2000, to March 31, 2005 (2005), did identify several issues pertinent to the Internal Parcel. However, these issues were either addressed or the area was excluded from the Internal Parcel.

For example, Specific Comment 119 in EPA's *Technical Comments on the Draft Final Five-Year Review Report* (2005) indicated that the FYRR should consider new information, such as MEC findings at locations not previously thought likely to contain MEC since the last FYR. The Army resolved EPA's comment prior to publication of the NOIDp by documenting the locations of all MEC recovered site-wide at RMA. This report, *Summary of Munitions and Explosives of Concern Recovered on Rocky Mountain Arsenal During Remedy Execution* (2006), indicates that there have been no unexpected discoveries of MEC found outside of remedy project boundaries within the Internal Parcel area.

EPA Specific Comment 7 on the FYRR questioned the process for maintaining lake levels in support of the remedy. The *ROD* requires maintenance of lake levels for two reasons: hydraulic containment or plume control to prevent South Plants plumes from migrating into the lakes; and to support aquatic ecosystems while the lake water is used to support the remedial activities (e.g., for dust suppression). Prior to publication of the NOIDp, the following actions were taken to address these *ROD* requirements for the lakes.

- In 2004 (during the FYR period), the U.S. Geological Survey issued the results of a groundwater study to determine whether the contaminant plumes were reaching the lakes. The results, documented in the *Final South Lakes Ground-Water Monitoring Report June 1, 2001 – May 31, 2003,* indicated that contaminants were not entering the South Lakes even when the lake levels were very low. Based on the results of this study, an *Explanation of Significant Differences for Groundwater Remediation and Revegetation Requirements, Rocky Mountain Arsenal Federal Facility Site* (*ESD*) was prepared and approved on March 31, 2006. This *ESD* removed the requirement from the *ROD* to maintain lake levels for hydraulic containment purposes.

- In December 2005, the USFWS finalized a *Management Plan for Protection and Monitoring of Lake Ladora, Lake Mary and Lower Derby Lake During RMA*

Remediation (*Lake Level Management Plan*). This *Lake Level Management Plan* defined aquatic ecosystem goals, monitoring requirements, and minimum lake level requirements necessary to support aquatic habitat. *Lake Level Management Plan* requirements were incorporated into the Final *Interim Rocky Mountain Arsenal Institutional Control Plan* (*IRMAICP)* that was updated in March 2006.

Therefore, EPA has determined, with concurrence from the State of Colorado, that all appropriate actions under CERCLA for the Internal Parcel have been implemented to protect human health, welfare, and the environment and that no further response action by responsible parties is appropriate.

EPA will continue to require the conduct of FYRs at RMA in accordance with the most current revisions of the *Comprehensive Five-Year Review Guidance* (OSWER Directive 9355.7-03B-P), dated June 2001. The FYRs are conducted site-wide over the original NPL boundaries, which includes the Internal Parcel and the previously-deleted SPA/SDA and the WTP. The FYR process includes notifying the public that a review is being conducted. Additionally, fact sheets, public meetings, or community member interviews may be held at appropriate stages of the review. At the conclusion of the FYR, the public will be notified and a copy of the report made available (*Superfund Community Involvement Handbook*, 2002).

Areas Proposed for Partial Deletion

(6) Several commenters did not want to see any part of RMA deleted until the whole site is cleaned up. Commenters expressed concern that this approach would not be protective of human health and the environment and would result in a patchwork of cleanup sites surrounded by wildlife refuge activities. Commenters also expressed concern that the areas of remediation should be contiguous. One commenter used the example of additional contamination discovered along the Sand Creek Lateral after the area had been deleted from the NPL as justification for not proceeding with partial deletion.

EPA Response**:** The primary criteria used to determine if an area is suitable for deletion is found in 40 Code of Federal Regulations (CFR) 300.425(e), which provides for sites to be deleted from the NPL. Specifically, the Internal Parcel of the RMA/NPL Site meets the requirements of Section 300.425(e)(1)(i): "Responsible parties or other persons have implemented all appropriate response actions required." The Partial Deletions Rule was published on November 1, 1995, and was intended to allow portions of a site or an OU that have been cleaned up to be available for productive use, especially where total site cleanup may take many years (*Close Out Procedures for National Priorities List Sites*: OSWER Directive 9320.2-09A-P, January 2000). This description accurately reflects the ongoing cleanup at the RMA/NPL Site, which is over 50 percent complete, i.e., ten years of the fifteen-year schedule have passed and 16 of the 31 remedy projects have been completed.

Based on the best available information, the response actions for the sites have been completed, and there is no information to suggest that contamination may remain in the Internal Parcel. While there is always the possibility that contamination may be discovered in the future, as occurred with contamination on the banks of the Sand Creek Lateral within the SPA, at this time the Administrative Record supports deletion of the Internal Parcel. Although the area undergoing remediation associated with the Sand Creek Lateral is not within the Internal Parcel, the Sand Creek Lateral is discussed in detail in Comment 22 (Section D).

In order to communicate the successful cleanup of portions of sites, and promote redevelopment, EPA's policy on partial deletions explicitly approves deleting portions of sites when no further action is appropriate for that portion of the site. "Such portion may be a defined geographic unit of the site, perhaps as small as a residential unit, or it may be a specific medium at the site, e.g., groundwater…." (60 Fed. Reg. 55467, Nov. 1, 1995). The Internal Parcel deletion is consistent with other partial deletions that leave islands of NPL surrounded or abutted by deleted lands, e.g., Cecil Field, (68 Fed. Reg. 27746-27747, May 21, 2003). Contaminants requiring remediation rarely fill a section or confine themselves neatly to a section or regular pattern. In addition, much of the land proposed for deletion did not require remedial activities. In view of the policy that

encourages partial deletions within NPL sites, delay in deleting entire sections of land because small areas are required for continuing response actions is not necessary.

Timing of Deletion

(7) The SSAB wondered what is the great value to the people of Denver, the State of Colorado and even the Army that this deletion take place in fiscal year 2006 versus fiscal year 2007?

EPA response**:** As mentioned in the previous response, the requirements and conditions necessary for deletion to occur have been met. Once the requirements have been met, EPA can proceed with deletion at any time. Deletion communicates to the public the successful implementation of the remedy and progress toward final cleanup. It helps the Army achieve its goal of transferring property and furthers the purposes of the *Refuge Act*. The USFWS gains more property for the Refuge, which increases Refuge Revenue Sharing fees paid to Adams County.

In 2004, the Army requested that EPA proceed with deletion. One goal identified in the *RMA Federal Facilities Agreement* (*FFA*) (1989) states:

> following certification of completion of the Final Response Action, for the On-Post Operable Unit, significant portions of the Arsenal will be available for open space for public benefit (including, but not limited to, wildlife habitat(s) and park(s)) consistent with the terms of this Agreement. Portions of the Arsenal will be made available for such use at the earliest practicable date consistent with any necessary Response Actions.

After deletion, the majority of the Internal Parcel will be transferred to the Refuge. The value in deleting this year rather than next is that it will allow achievement of the purposes of the Refuge to occur sooner. These purposes, as identified in the *Refuge Act* (1992), include:

- To conserve and enhance populations of fish, wildlife, and plants within the refuge, including populations of waterfowl, raptors, passerines, and marsh and water birds.

- To conserve species listed as threatened or endangered under the Endangered Species Act and species that are candidates for such listing.

- To provide maximum fish and wildlife oriented public uses at levels compatible with the conservation and enhancement of wildlife and wildlife habitat.

- To provide opportunities for compatible scientific research.

- To provide opportunities for compatible environmental and land use education.

- To conserve and enhance the land and water of the refuge in a manner that will conserve and enhance the natural diversity of fish, wildlife, plants, and their habitats.

- To protect and enhance the quality of aquatic habitat within the refuge.

Unidentified Potential Risks

(8) The SSAB requested that EPA consider what will be lost in the *NCP* principle and requirements of public participation, and what potential risks to the public may go unidentified in the future, before making its final decision to support this large deletion at this time.

EPA Response: CERCLA, as implemented by the *NCP*, requires specific community involvement activities that must occur at certain points throughout the Superfund process. EPA has provided reasonable opportunity for public participation in the deletion process that is beyond *NCP* requirements. An extension to the 30-day comment period was granted by EPA that resulted in a 60-day public comment period extending from April 26, 2006, through June 26, 2006. As exhibited in Attachment A, EPA has maintained an active public outreach program to notify interested community stakeholders, especially those who may be more directly affected in adjacent communities.

As stated in the NOIDp, EPA has determined, with concurrence from the State of Colorado, that all appropriate CERCLA response actions have been completed within the Internal Parcel to protect public health and the environment, and no further response action by responsible parties is required. For this reason, no additional monitoring,

assessments, or investigations of the media included within the Internal Parcel are planned. So, in the unlikely event that a potential risk may go unidentified, whether deletion occurs now or in the future does not have any bearing on the identification of that risk. Should additional contamination be found, EPA retains its authority to address threats to human health and the environment under Sections 104 and 106 of CERCLA as discussed in Comment 19.

Subsurface Soil

(9a) The SSAB expressed a concern regarding the lack of discussion of subsurface soil.

EPA Response: Surface media, including soil, in the context of the deletion, includes the RMA-defined surface and subsurface soil. The entire soil media is addressed within the NOIDp and the *Technical Memorandum*. For purposes of deletion, the use of the term "surface soil" applies to the entire soil media from surface to groundwater. Unlike the use of the term 'surface' or 'surficial' when applied to sampling soil, surface media pertains to all soil, sediments, and surface water which is above the highest groundwater aquifer. Separation of the soil media into RMA-defined subsurface and surface soil within the *Technical Memorandum* is unnecessary and would confuse the deletion.

The overall soil remedy for the RMA/NPL site requires excavation of much of the soil that exceeds acceptable contaminant levels for protection of human health (HHE) soil for disposal in the on-site hazardous waste landfills (HWLs). While the *ROD* identified specific excavation requirements for the upper one foot of soil (surface), specifically for soil posing an unacceptable risk to biota (biota) soil and acute HHE soil; once the depth and extent of contaminated soil to be excavated was defined, it was no longer necessary to distinguish between surface and subsurface HHE soil. Consequently, the designs for the soil remedies identified excavation depth and extent of HHE soil and, because all HHE soil regardless of depth was disposed in the on-site HWL, it was not necessary to maintain a distinction between the surface and subsurface soil. Individual CCRs document that the implementation of each project was conducted in accordance with the

ROD and associated approved final design and provide information showing the extent and depth of excavation. The CCRs identify total soil remediation volumes for each Study Area Report (SAR) site and do not distinguish between surface and subsurface soil volumes. The *Technical Memorandum* is consistent with this understanding.

(9b) The SSAB also commented on the lack of discussion about potential access to the subsurface through ecological activity and whether subsurface soil could be brought to the surface through future range activities, for example if buffalo are placed on the RMA Refuge.

EPA Response: As noted above, surface media in the context of deletion includes the soil profile from surface to groundwater. All human health and ecological-related response actions pertaining to the entire soil profile have been completed in the Internal Parcel.

The remedy is based on, and addresses, both human health and ecological exposure pathways. The future land use as a wildlife refuge was considered in the determination of the cleanup goals for the RMA. The RMA risk assessment evaluated risks to human and ecological receptors. As discussed in the *ROD*, the risk assessment to biota used soil concentrations in the 0 to 1-foot depth range for a biota's exposure area, with the exception of a 0 to 20-foot profile for the prairie dog exposure range. The risk to biota has been extensively evaluated in the *Integrated Endangerment Assessment/Risk Characterization* (*IEA*/*RC*) and *ROD*-directed studies, as summarized in the *Technical Memorandum*. The risk evaluations and completed remedial activities are protective of biota consistent with the future use of RMA as a wildlife refuge, which may include large grazing animals such as bison.

In areas where HHE soil is to be left in place (South Plants Central Processing Area, Complex and Shell Trenches), the area is segregated beneath a Resource Conservation and Recovery Act (RCRA)-equivalent cover, which includes an 18-inch layer of concrete cobble to prevent intrusion by burrowing animals through a cover into the contaminated

soils. While the habits of non-burrowing animals, such as bison or deer, can be somewhat destructive (bison wallows, deer trails); they are part of the Refuge's short-grass prairie natural ecosystem. As part of the regular operations and maintenance requirements, the Army is required to regularly assess all cover areas and take appropriate measures to repair any damage to covers whether from animals, weather, or human activity.

The *ROD* remedy also included backfill of the HHE-soil excavations to break the exposure pathway to biota. Where HHE-soil excavations were not backfilled, further sampling and excavation was conducted to eliminate risk to biota, as described in the *Technical Memorandum*.

Volatile Emissions

(10) The SSAB expressed a concern regarding the threat of volatile contamination within the groundwater reaching ground surface in deleted areas. The SSAB indicated that because groundwater plume migration is not actively tracked through mapping the on-post plume, it does not appear that the sections overlying the major plumes should be deleted.

EPA Response: Volatile air emissions from groundwater are typically of concern in residential areas where the water table is shallow and there is potential for containing volatilized chemicals in an indoor area, such as a basement, and is typically not a concern in outdoor areas at the ground surface. The potential health risks in the On-Post OU of the RMA/NPL Site were estimated prior to the *ROD* and are documented in the *IEA/RC* Report. The *IEA/RC* included an evaluation of a vapor inhalation pathway within an enclosed space to estimate inhalation health risks to a commercial worker if their duties required them to work in a future basement scenario. The risk from the enclosed space vapor inhalation pathway was found to be minimal. Risks posed by volatilized contamination emitted directly from the ground surface will be less than for an enclosed space.

There are no restrictions prohibiting USFWS from constructing buildings appropriate for the Refuge; however, it has been agreed that the Army or USFWS will perform an evaluation of risks prior to construction of any basements on post, as documented in the Final *IRMAICP*. The Army agreed to this additional restriction so that potential concerns related to a basement vapor exposure could be definitively resolved if, and when, a specific location was being considered for construction of a basement structure.

For lands that are transferred out of Federal ownership, i.e., the previously deleted WTP, Section 5 (d) of the *Refuge Act* mandates perpetual restrictions be attached to deeds. These restrictions include prohibitions on use of the property for industrial or residential purposes.

Odor Monitoring

(11a) It was the SSAB's understanding that the RMA is the only site where odor monitoring is used, at least within the State of Colorado, and had not encountered the technique at some of the most complex military sites in the country.

EPA Response: Monitoring of odors at the RMA is conducted in order to protect the public from, and minimize, nuisance odors. The *ROD* identifies Colorado Regulation No. 2 (5 CCR 1001-4) as an Applicable or Relevant and Appropriate Requirement (ARAR) and indicates that nuisance odors will be minimized. Colorado Regulation No. 2 is a regulation applicable to any work within the State of Colorado, not just to the RMA/NPL site. Any other work site throughout the State, whether it is being conducted under CERCLA or not, would be required to adhere to and be in compliance with this regulation. Colorado Regulation No. 2 is based on odor monitoring conducted with a scentometer that allows dilution of the odor to a threshold level so that a dilutions/ thresholds value, the criteria in the regulation, can be determined. The State of Colorado requires certifications for those people that monitor and evaluate odors with respect to the Regulation No. 2 criteria.

At RMA, air quality must adhere with Colorado Regulation No. 2 at the fenceline, and scentometer-based measurements are collected under certain conditions and action levels. Interior to RMA, a more practical method of odor monitoring is conducted using the n-butanol scale, where the strength of odors are estimated relative to n-butanol standards. This method of odor measurement is an American Society of Testing and Materials (ASTM) method, ASTM Method E-544-75. The method is based on scientific principles of odor intensity and uses well established and industry accepted methods to ensure the public is protected from nuisance odors. Therefore, the odor monitoring conducted at RMA is based on both a regulatory requirement (Colorado Regulation No. 2) and a proactive method (n-butanol intensity).

(11b) The SSAB expressed a concern that the use of odor monitoring increases the likelihood of public exposure to air emissions. The SSAB expressed a concern that site plans indicate a tendency to use odor monitoring as a substitute for more frequent air sample collection and analysis.

EPA Response: EPA is unaware of site plans where odor monitoring is used as a surrogate for air sample collection and analysis. As the SSAB pointed out in their comment, a dependable correlation between detection of volatile compounds through odor monitoring compared to actual lab-analyzed chemical concentrations does not exist. Some compounds have a health-based risk level corresponding to concentrations greater than the odor threshold, while other compounds have health-based concentrations less than the odor threshold. Odor monitoring does not, and has not, replaced or substituted for chemical emission air monitoring at RMA. Since 1999, the air program at RMA has included a formal dual-pronged approach to protection of human health and the environment, including protection from nuisance odors. The requirements of the air program are captured in the *Site-Wide Odor Monitoring Program Plan* that addresses odors, odor control actions, and odor monitoring and the *SWAQMP* that addresses chemical emissions, emission control actions, and air emission monitoring.

Long-term air monitoring has been conducted at RMA since 1987 with the inception of the Comprehensive Monitoring Program (CMP). The objectives of the CMP included collection of baseline data as part of the RI conducted at RMA and evaluation of potential air quality health hazards. Fenceline air monitoring was also conducted during the Basin F Interim Response Action (IRA) in 1988 and 1989. In 1991, the CMP and Basin F IRA programs were combined into the Comprehensive Air Quality and Meteorological Monitoring Program, which was the guiding program until the *SWAQMP* was put into place in 1999.

The current *SWAQMP* requires monitoring at the fenceline and visitor locations for the contaminants of concern (COCs), including total suspended particulate (TSP), volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), organochlorine pesticides (OCPs), metals, and mercury. The frequency of monitoring is either every 3rd day, every 6th day, or every 12th day, depending on the remedial activities occurring at any given time and their predicted emissions. Besides site-wide programs, the air program at RMA includes project-specific chemical emission monitoring for those implementation projects where air modeling results indicate that additional monitoring and/or controls are warranted. These project-specific, air-related requirements are in addition to the normal site-wide requirements. Project-specific air and odor-related requirements are anticipated for the remaining projects at which contaminated soil will be disturbed and will not be curtailed because of deletion of the Internal Parcel. Furthermore, consideration of air emissions is required during the design of implementation projects, and the final designs are often partly the result of including methods and controls designed to ensure that the project will not emit COCs above health-based action levels. EPA also conducts a collocated air monitoring program that is designed to evaluate the reproducibility of the Army's results. To date, this collocated program has indicated that the Army's results are reproducible with the exception of particulate matter less than 10 microns in diameter (PM-10), which was overestimated. TSP is now used as a surrogate for PM-10. In summary, the air program at RMA, as a separate and independent program, is sufficiently comprehensive and conservative to be protective of human health.

Buffer Zone

(12) The SSAB expressed an interest in how the buffer zone was determined around areas that have remedial activities remaining to be completed, and that abut the Internal Parcel, because of a concern with potential risk of exposure to air emissions.

EPA Response: The remedial action projects remaining to be completed that involve disturbance of contaminated soil are primarily located interior to the RMA Central Remediation Area (CRA). There is a greater than 50-foot buffer between these project boundaries and the Internal Parcel boundary, in some cases up to one-half mile. Projects outside of the CRA have lower levels of contamination with associated lower risks; therefore, the 50-foot buffer was not based on risk posed by chemical air emissions. Instead, the 50-foot buffer was established for the non-CRA projects based on the need for remedial action support, including truck access/turnaround considerations, and haul roads with associated potential spills.

Once the excavation of Sand Creek Lateral is completed (expected by July 28, 2006), the areas of the Refuge currently open to visitation are located no closer than approximately one mile from the two remaining major project areas that involve disturbance of contaminated soil; approximately two miles from the Basin F projects and one mile from the Lime Basin slurry wall project. Currently, the USFWS visitor program allows visitors to enter the Refuge only through the south gate and follow a designated road to the Visitor Center. This route is clearly marked by gates which bar entry to adjacent roads. Once at the Visitor Center, participants attend formal programs led by USFWS staff and volunteers or use the hiking paths along and south of Lake Mary and Lake Ladora. The current *Public Use Plan* (2004) prohibits public access in areas north of the Visitor Center and Lakes area. USFWS staff and volunteers patrol the entry road, hiking paths and other program areas to ensure visitors do not stray away from allowed visitor areas. This management approach to allow restricted access for visitors will not change as a result of deletion. Any future revisions to the *Public Use Plan* (2004) will be subject

to public review. The *Memorandum of Understanding* (2005) restricting access to the northwest part of the Internal Parcel was developed as an additional precautionary measure.

Air emissions are measured at the current fenceline and near the Visitor Center to verify that potential risks to visitors and the nearby communities are minimized. These requirements to control air emissions within the levels specified by the *SWAQMP* remain in place irrespective of the deletion of the Internal Parcel and are designed to be protective of human health. Air emissions and the *SWAQMP* are discussed in greater detail in Comment 11.

Institutional Controls

(13a) The SSAB thought it was unfair to comment on a major deletion for property surrounding the areas of major contamination prior to having a final plan for ICs.

EPA Response: RMA currently has a final, approved IC plan that is tailored to meet the *ROD* and site-specific requirements for the interim period when the last remedial activities are on-going and before completion of the overall project remedy is achieved. This plan is the Final *IRMAICP* (2006). The Final *IRMAICP* applies to all federal lands and facilities within the boundaries of the RMA and the Refuge, including the Internal Parcel. The Final *IRMAICP* guides the ICs for the RMA until all surface remedial activities have been completed and the Preliminary Close-out Report approved. At that time, a Final Institutional Control Plan will be written that identifies controls applicable to the RMA and the Refuge after all remedial activities have been completed.

Institutional controls are administrative and/or legal controls to minimize the potential for human exposure to contamination and/or protect the integrity of the remedy whenever a site cannot support unlimited use and unrestricted exposure. The existence of ICs does not in itself render a response action incomplete. However, ICs applicable to a site must

be in place before response actions can be considered complete (*Close-Out Procedures for National Priorities List Sites* (OSWER Directive 9320.2-09A-P, 2000)). The Final *IRMAICP* identifies the ICs applicable to all areas of RMA, including the Internal Parcel. Because ICs are in place, the response actions can be considered complete with respect to the *NCP* criteria.

(13b) The SSAB wondered how the public is supposed to comment on the adequacy of public protection for property to be deleted that is directly adjacent to large areas of contamination that will not have remedies in place nor have associated ICs for several years to come.

EPA Response: The deletion process focuses on the media being deleted from the NPL, not on the media, or the contamination, that remains on the NPL. This criteria, as stated in the CFR at 40 CFR 300.425(e), provides for sites to be deleted from the NPL where no further response is required to protect public health or the environment.

The presence of large areas of contamination adjacent to a site proposed for deletion is not a criteria identified by the *NCP* for site deletion. Nevertheless, the Final *IRMAICP* includes ICs applicable to areas within the Internal Parcel due to the proximity of areas of contamination. For example, within the Internal Parcel, refuge visitor access is not allowed within the area surrounding Basin F while the project is ongoing. In addition, the Final *IRMAICP* includes ICs for areas remaining on the NPL where remedial activities are not yet complete. For example, the Final *IRMAICP* identifies ICs applicable to the cover areas even though these covers are not yet constructed. The final ICs required once the remedy is complete may actually be less restrictive than the interim ICs. For example, the buffer area around the Basin F area will no longer be required.

(13c) In addition, the SSAB stated that once deletion occurs, ICs are the only mechanism through which public safety and protection of the environment is controlled.

EPA Response: Institutional controls are controls to minimize the potential for human exposure to contamination and/or protect the integrity of the remedy whenever a site cannot support unlimited use and unrestricted exposure. However, the remedy as prescribed by the *ROD* is designed to be protective of human health and the environment. As indicated in 40 CFR 300.430 (a)(1)(iii)(D), while ICs should be used to supplement engineering controls or even constitute a part of the remedy, "the use of institutional controls shall not substitute for active response measures (e.g., treatment and/or containment of source material, restoration of ground waters to their beneficial uses) as the sole remedy unless such active measures are determined not to be practicable.…" At the RMA, for example, ICs exist to prohibit the ingestion of groundwater, but that does not eliminate the requirement for the remedy to meet ARARs, such as Containment System Remediation Goals, at the boundaries of the RMA/NPL site.

At RMA, ICs supplement engineering controls, such as fences, locked gates, and extensive cap and cover systems. Even in the absence of ICs the potential for human exposure to contaminants at RMA is very low with the engineering controls that are in place.

The most stringent ICs at RMA were developed as part of federal law and court orders. The Interim and Final Institutional Control Plans for RMA are developed as operational plans that synthesize the requirements of the *FFA*, the *Refuge Act*, and other mandates, that the Army and USFWS use to implement and enforce those IC requirements.

Prohibition on Excavation

(14) The SSAB wondered how the USFWS will make sure that their own personnel as well as public visitors do not dig in the Internal Parcel in spite of the restrictions on the construction and use of basements and excavation into a site

containing pesticide contamination. It was unclear to the SSAB whether there are certain controls or outright prohibitions on these activities.

EPA Response**:** There are no prohibitions on USFWS digging or excavating for refuge management purposes on deleted and transferred lands. In the normal course of refuge operations, USFWS is required to locate utility lines, consider cultural resources, and follow other standard procedures before excavating. The Final *IRMAICP* identifies areas of residual soil contamination on deleted lands. Those areas are posted and USFWS personnel are trained on the locations and restrictions applicable to those sites.

Any type of digging or excavating by the public, without a Special Use Permit, is prohibited on all National Wildlife Refuges and constitutes a criminal violation of the National Wildlife Refuge Administration Act. This federal law is enforced by USFWS law enforcement officers. With more than 400,000 visitors in the past 17 years, there have been no cases of refuge visitors digging in the ground on RMA.

Basements are not prohibited at RMA, but they cannot be built or used unless additional studies are conducted and additional data is analyzed. The Final *IRMAICP* (2006) states:

> …[t]he Army and the USFWS will neither build, use, nor allow the use of any basements at RMA unless the Army or the USFWS prepares a feasibility study that addresses the impacts of the use of basements on human health and the environment, and substantiates that such impacts are minimal.

Enforcement of Institutional Controls

(15) The SSAB expressed a concern that almost every section proposed for deletion had a portion excluded from the Internal Parcel, and given those exclusions, how access and land-use controls will be enforced.

EPA Response: Site-wide access and land-use controls are described in the Final *IRMAICP* and summarized in Section 7.4 of the *Technical Memorandum.* These controls include *ROD* and *FFA* prohibitions on residential development, use of groundwater and

surface water as potable water, consumption of fish and game, agricultural activities, and major hydrogeological alterations with the exception for Response Actions. Additional controls prohibit the use and construction of basements unless a FS is performed, control access to remediation areas by limiting access gates and maintaining perimeter fencing, control access in accordance with SafeRAC (Safe RMA Access and Control) procedures, maintain signs, prevent excavation into a site containing pesticide contamination, maintain water levels in Lower Derby Lake to minimize potential human exposure, manage access around Basin F Wastepile, protect engineered and groundwater remedial action structures, and maintain lake levels to support aquatic ecosystems.

Enforcement of controls is made easier at RMA by the use of engineering controls, including fences and locked gates. General access to RMA is controlled by the Army through Gate Security Procedures and Activity Coordination Permits (*IRMAICP* 2006). All activities at RMA, including public use and implementation projects, are submitted to the Army's SafeRAC computerized activity coordination program. The SafeRAC program is a computerized database used to coordinate all activities site wide. All entities conducting activities on the RMA are required to enter each of their activities in the program including type of activity, location, date, time, and a point of contact. This program ensures that conflicting activities do not occur and all activities on-site are coordinated safely.

Violations of ICs by on-site workers are handled through various enforcement mechanisms that are proportional to the violation, as generally described in the Final *IRMAICP* (2006). Minor and inadvertent violations of laws, regulations, policies, and procedures governing access and activities at the site may be handled administratively through management actions by the parent or sponsoring organization(s) at RMA and may include various forms of disciplinary action. As warranted, the response to these violations can escalate to include more severe penalties such as termination of contract, barring future entry to RMA, or termination of employment. More serious or repeated violations may result in prosecution.

The USFWS' *Public Use Plan* (2004) discusses law enforcement at the Refuge more specifically. USFWS law enforcement personnel report to the Supervisory Refuge Operations Specialist who ensures that all duty positions are covered and that public use facilities are maintained in a safe and operational condition. The Supervisory Refuge Operations Specialist coordinates with Central Dispatch, Adams County Sheriff, the Army Remedy Execution, and the Supervisory Park Ranger; and maintains routine contact with project managers and Health and Safety personnel regarding remedy work that may affect public use programs. USFWS law enforcement officers patrol the Refuge during public use programs to respond to emergencies, enforce laws, apprehend and cite violators, provide public information, and provide protection for the public, wildlife, and private and government property on the Refuge. In addition, staff members are briefed weekly on restricted access areas. All USFWS field personnel carry radios that link them to the Army and USFWS law enforcement networks to facilitate requests for assistance during routine operations.

Since 1989, there have been over 400,000 public visits to RMA, without inadvertent wandering of visitors into restricted areas. USFWS and the Army have effectively controlled visitors and unauthorized personnel from entering the area covered by the 2005 *Memorandum of Understanding* (described in Comment 2 along with the visitation program) since the cleanup began in 1996 - prior to the *Memorandum of Understanding* being developed. Site-wide there have been a handful of access control violations at RMA that involved trespass, which were dealt with appropriately. As the land management agencies, the Army and USFWS are responsible for ensuring the access and land-use control requirements in the Final *IRMAICP* are effectively enforced.

Operation and Maintenance (O&M)

(16) The SSAB queried what mechanisms/processes are in place to address O&M issues in deleted areas.

EPA Response**:** Only the groundwater part of the remedy requires O&M in the Internal Parcel because there are no caps, covers, or landfills. The Final *IRMAICP* (2006) indicates that the groundwater pump and treat systems will remain under Army jurisdiction as long as they are in operation. These systems each have their own O&M Manual covering trouble-shooting and corrective actions.

The *Long-Term Monitoring Plan for Groundwater* (*LTMP*) (1999) describes the groundwater monitoring program at RMA. The *Rocky Mountain Arsenal Ground-water Sampling and Analysis Plan* (GWSAP) (2003) outlines the well inspection and sampling procedures for groundwater monitoring at RMA. The *Well Retention and Closure Program [Plan] for RMA* (*WRCP*) (2003) serves as a companion document to the *LTMP* and identifies the criteria for retaining and closing wells on post and off post. The acts of deletion and transfer of property and/or groundwater do not remove wells from the *LTMP*. The wells at which the groundwater quality or levels are to be monitored at least annually are identified in the *LTMP*. The *GWSAP* and the *WRCP* instruct field personnel that conduct this monitoring to note the condition of the wells. This would be done for those wells located in the Internal Parcel as well as those remaining on the NPL site. The *WRCP* also identifies a decision and reporting process for damaged wells. This process requires notification to the Regulatory Agencies within a two-week timeframe depending upon the well category of damage to an *LTMP* well, and stipulates that decisions on repairing/replacing the well will be made within 90 days. Although the FYR is not linked to deletion, EPA comments on the FYRR indicated that the timely notification and decision making with respect to damaged wells has not always been conducted in accordance with the *WRCP* during the FYR period. It is anticipated that issues identified in the FYRR with respect to well maintenance will be addressed as part of the process to update the LTMP, which is scheduled to occur in the fall of 2006. Furthermore, because this issue has been brought to the Army's attention, EPA expects that timely notification and decision making with respect to damaged wells will occur prior to the update of the *LTMP*.

Adequacy of Characterization

(17a) The SSAB expressed a concern about the level of characterization conducted in the property proposed for deletion.

EPA Response: As with many CERCLA sites, limited historical information exists documenting the manufacturing and waste disposal practices at RMA. Therefore, one of the critical steps in the CERCLA process is to compile and review all available information regarding site activities and characteristics. EPA guidance states that potential contaminant "sources can be delineated and characterized through visual inspection during site reconnaissance; interviews with facility representatives, employees, or neighbors; and file searches (especially those at the facility itself) for disposal records, waste manifests, and waste sampling data" (*Guidance for Performing Preliminary Assessments Under CERCLA*: Publication 9345.0.01A, 1991). As part of the investigation activities for the Internal Parcel, file searches, "desktop" information (e.g., aerial photographs) searches, and site reconnaissance were conducted. All portions of the Internal Parcel were investigated.

The review of available historical information and RI soil sampling identified twelve soil projects requiring remediation. As the designs were developed and additional information obtained, the boundaries of the soil projects were refined. Additional areas were added to some designs to address recently identified ecological-risk soils resulting from design-refinements required by the *ROD*. Discovery of trash or debris, or visual staining during excavation, required remedy boundaries to be expanded until all trash, debris, or staining were removed.

As described in the *Technical Memorandum*, ten studies were performed that are relevant to the deletion of the Internal Parcel since the signing of the *ROD* on June 11, 1996. These include: 1) the *Summary and Evaluation of Potential Ordnance/Explosives and Recovered Chemical Warfare Materiel Hazards at the Rocky Mountain Arsenal* (*OE/RCWM Evaluation Report*) (2002), 2) *Characterization of Dioxin Concentrations in Surface Soils at RMA* (2001), 3) *Assessment of Residual Ecological Risk and Risk Management Recommendations at the RMA, Part I: Terrestrial Pathways and Receptors* (2002), 4) *Assessment of Residual Ecological Risk and Risk Management*

Recommendations at the RMA, Part II: Aquatic Pathways and Receptors (2003), 5) *Final Surface Munitions Debris Inspection Report* (2003), 6) *Final Report, Geophysical Screening Activities and Results* (1998), 7) *DIMP Investigation* (2002), 8) *Unbackfilled HHE Characterization* (2002), 9) *Former Chemical Sewer Section 26 and 35 Data Review and Summary Report* (2000), and 10) *Secondary Basins Soil Remediation Project and Section 35 Soil Remediation Project.* These studies were conducted specifically to assess if additional remedial activities were needed for any area on the RMA/NPL Site, not just those being considered for partial deletion or transfer. The ten studies are representative of the ongoing efforts to ensure that cleanup of the RMA/NPL Site is comprehensive and conducted appropriately.

(17b) The SSAB expressed a particular concern with respect to characterization of the ordnance areas.

EPA Response: Burn pits and ordnance disposal areas at RMA have been characterized or sampled during the RI, remedial design, and remedial construction phases. During the RI, soil samples were collected from burn pits and ordnance disposal areas to characterize the nature and extent of contamination, and metals were identified as potential COCs for these areas. Although explosives were not included in the target analyte list for the RI, these organic compounds would have been identified during the Phase I RI through the gas chromatograph/mass spectrometry (GC/MS) screens if present in samples. No explosive compounds were identified through this process.

The *ROD* acknowledges the potential for metals contamination at ordnance disposal areas and requires removing soil with concentrations of contaminants exceeding the Toxicity Characteristic Leaching Procedure (TCLP) regulatory levels. During the remedial design for the Burial Trenches/Munitions Testing projects, soil at munitions debris areas was sampled and analyzed for arsenic, heavy metals, and mercury. Results of the analyses showed that none of the soil associated with the munitions debris exceeded TCLP regulatory levels, indicating that despite the presence of metallic debris, there was no contamination leaching to the environment that required remediation.

In addition, the issue of explosive residue in soil was considered during the design of the Burial Trenches/Munitions Testing projects. The *Burial Trenches and Munitions (Testing) Soil Remediation Project 100 Percent Design Package* (2000) states:

> Explosive residue in soil or water typically has been attributed to demilitarization operations involving high-pressure washing of high explosives (HE) from munitions and the subsequent disposal of residual wastewater in unlined settling basins. No such operations have ever been conducted at these RMA sites. Instead, HE munitions were demilitarized by controlled detonation or incineration.
>
> Environmental degradation rates (half-lives) established for 6 of the chemicals associated with explosive residue are all 7 months or less in soil and 13 months or less in groundwater. Since none of the project sites have been active disposal areas for at least 14 years, and most have been inactive for at least 25 years, any explosive residue that might have been deposited would have been degraded by now and no longer poses a risk.
>
> Based on the opinion of Army ordnance experts expressed in this memorandum, explosive residue is not a remediation issue.

The excavation of the burn pits was "performance-based", i.e., all HHE *ROD*-identified soil was excavated, and, in addition, the excavation continued until all debris and discolored, stained, or charred soil was removed. The removal of all the visibly impacted soil in the burn pits and burial trenches is consistent with EPA guidance, which states that potential contaminant "sources can be delineated and characterized through visual inspection during site reconnaissance; interviews with facility representatives, employees, or neighbors; and file searches (especially those at the facility itself) for disposal records, waste manifests, and waste sampling data" (*Guidance for Performing Preliminary Assessments Under CERCLA*: Publication 9345.0.01A, 1991). Following the performance-based excavations, confirmatory samples were collected at many of the sites. As discussed in Section 6 of the Technical Memorandum, one site partially within and one site completely within the Internal Parcel were remediated by the Munitions Testing Soil Remediation Project. The *Munitions Testing Soil Remediation Project, Construction Completion Report, Part I* (2002) indicates that confirmatory soil samples were collected from both of these sites and analyzed for cadmium, chromium, and lead, which were identified to be the COCs for this site. The results at both sites were below

HHE criteria. Section 6 of the *Technical Memorandum* also discusses remediation of the sites within the Burial Trenches Soil Remediation Project. Within the Internal Parcel and for the combined parts of this project, the sites remediated by this project included: eight burn pits, two surface burn areas, seven debris areas, and one munitions debris stockpile. Thirty-five confirmatory soil samples were collected from the burn pits and analyzed for cadmium, chromium, and lead, which were identified to be the COCs for this site. The results were all below HHE criteria. Confirmatory samples were collected based on the most likely locations thought to have contamination, such as immediately below the burn pit and in areas remaining after removal of charred or stained soil and dense debris.

A complete description of all burn pits and ordnance disposal areas remediated within the Internal Parcel is summarized in the *Technical Memorandum*. Additional detail is provided in the *Munitions Testing Soil Remediation Project, Construction Completion Report, Part I* (2002), *Burial Trenches Soil Remediation Project, Construction Completion Report, Part I* (2003), and *Burial Trenches Soil Remediation Project, Construction Completion Report, Part II* (2004).

(17c) The SSAB also expressed a concern with characterization of the groundwater deleted east of E street, particularly with respect to whether the groundwater has been evaluated and monitored for explosive compounds and explosive-degradation compounds.

EPA Response: Sections 19, 20, 29, and 30 of the RMA were characterized during the RI. Explosives and explosive-degradation products were eliminated as candidates for the RMA target analyte list based on the absence of detections in GC/MS screens during the Phase I RI. Wells in Sections 19, 20, 29, and 30 are included in the water-level monitoring network, but water quality monitoring was not included in the long-term monitoring program for this area based on historical monitoring data.

As described above, the *ROD* remedy for munitions testing and burial trenches includes the removal of MEC, munitions debris, and soils associated with munitions debris that fail TCLP. Explosive residue and TCLP metals were addressed during pre-design studies for the Burial Trenches and Munitions (Testing) Soil Remediation Project and are summarized in the *Burial Trenches and Munitions (Testing) Soil Remediation Project 100 Percent Design Package* (2000). These studies showed that explosive residue and TCLP-metal concentrations were below risk-based regulatory levels. Considering these studies, the geology of the area, as well as the history of the disposal areas, there is no evidence of explosive or TCLP-metal soil contamination that could act as a source of groundwater contamination. The history of munitions at RMA is summarized in the *OE/RCWM Evaluation* Report (2002).

(17d) The SSAB also requested a list of Internal Parcel Area sites that were either missed or thought to have been remediated and only later found to contain additional contamination.

EPA Response: EPA is not aware of any sites in the Internal Parcel that were not identified by the *ROD*, but subsequently found to contain contamination. In addition, only one site in the Internal Parcel, SAR Site NCSA-8b, may be considered to have been remediated and later found to contain additional contamination. Other areas, such as the Sand Creek Lateral, are not within the Internal Parcel. The discovery of additional contamination at the Sand Creek Lateral is discussed in Section D of this Responsiveness Summary.

Section 6.3.6 of the *Technical Memorandum* discusses SAR Site NCSA-8b. This site was identified for sampling to assess ecological risk because the site was not backfilled after excavation of the HHE soil. The results of the additional sampling to assess ecological risk identified additional HHE soil. Through the process of confirmatory sampling, an additional 11,133 bank cubic yards (bcy) of Contingent Soil Volume (CSV) was excavated and transported to the HWL.

It is noted that during the original remediation activities, sixteen confirmatory samples had been collected after excavation of the design HHE soil volume, and 387 bcy of CSV were identified, excavated, and hauled to the HWL. Confirmatory sampling had been continued until the contaminant concentrations were below HHE levels.

While unexpected, the discovery of additional contamination at SAR Site NCSA-8b subsequent to the original remedial action and collection of confirmatory samples demonstrates the multiple, sometimes overlapping, elements of the selected remedy in the *ROD* that protect human health and the environment. These elements include excavation of known contaminated HHE soil, excavation of Biota soil, further evaluation of ecological risks, backfill of HHE excavation areas, and provisions for the collection of confirmatory samples and the identification of CSV.

(17e) The SSAB also queried the adequacy of characterization in the Internal Parcel within Section 35 because of the discovery of additional contamination on the banks of the Sand Creek Lateral.

EPA Response: The history of discovery of previously unidentified contamination along the Sand Creek Lateral is discussed in Comment 22. This discovery and subsequent characterization resulted in the conclusion that the contamination along the banks of the Lateral (and one other ditch) was due to ditch maintenance activities, which included removal of sediment from the ditch, deposition along the ditch banks, and subsequent grading or disturbance of the deposited spoils. These activities were limited to the immediate area of the Lateral (and one other ditch); therefore, the remainder of the section is retained within the Internal Parcel.

Transfer of Property

(18) The SSAB questioned whether the proposed plan to transfer property where the treatment systems are located is appropriate given the *Refuge Act*. If that was

allowed, the SSAB also wondered what would prevent the Army from transferring all land to USFWS, including the areas of the landfills and caps.

EPA Response: The SSAB has correctly stated that the Army cannot transfer certain properties and facilities, including water treatment facilities. The 1992 *Refuge Act*, Section 2 (c)(1) states:

> Property used for environmental cleanup purposes. The Secretary of the Army shall retain jurisdiction, authority, and control over all real property at the Arsenal to be used for water treatment; the treatment, storage, or disposal of hazardous substances, pollutants, or contaminants; or other purposes related to response action at the Arsenal and . . .

As required by Section 2(c) of the *Refuge Act*, the Army cannot transfer landfills and capped areas, which are used for "the treatment, storage, or disposal of hazardous substances, pollutants, or contaminants." There are no such areas in the proposed Internal Parcel.

Restrictions on Additional Investigations

(19) The SSAB questioned whether this deletion could conceivably impact the ability of the EPA or State of Colorado to conduct additional investigations in the deleted area, if future information warrants such action.

EPA Response: EPA's authority to address threats to human health and the environment is contained in Sections 104 and 106 of CERCLA. These sections of the law apply to any actual or threatened release, irrespective of whether the release is listed on the NPL. These EPA authorities will continue to apply to deleted property. In addition, 40 CFR 300.430(e)(3) provides for a site to be restored to the NPL, without further application of the hazard ranking system, if there is a significant release from a deleted site. EPA has ample authority to address any future threats to human health or the environment that may arise from releases on deleted property.

Signs

(20) Two commenters thought that signs would be inadequate to keep people out of contaminated or restricted areas and fences or other barriers should be used to restrict access.

EPA Response: The restrictions to visitor access on the Refuge are summarized in EPA's Response to Comment 2, but are repeated here. Currently, the USFWS visitor program allows visitors to enter the Refuge only through the south gate and follow a designated road to the Visitor Center. This route is clearly marked by gates which bar entry to adjacent roads. Once at the Visitor Center, participants attend formal programs led by USFWS staff and volunteers or use the hiking paths along and south of Lake Mary and Lake Ladora. The current USFWS *Public Use Plan* (2004) prohibits public access in areas north of the Visitor Center and Lakes area. USFWS staff and volunteers patrol the entry road, hiking paths and other program areas to ensure visitors do not stray away from allowed visitor areas. This management approach to allow restricted access for visitors will not change as a result of deletion. Any future revisions to the *Public Use Plan* (2004) will be subject to public review. The *Memorandum of Understanding* (2005) restricting access to the northwest part of the Internal Parcel was developed as an additional precautionary measure.

The restrictions in place, including signs, are reasonable measures to prevent inadvertent trespass given the controlled program under which visitation is conducted. Additional barriers or fences, unless extremely formidable, would likely be insufficient to prevent willful trespass by individuals into restricted areas.

With respect to the remaining restricted areas on the NPL site, visitor access is controlled in accordance with RMA's SafeRAC procedures. Health and safety policies require setting exclusion zones surrounding the areas of active remedial action that involve excavation and disposal of human-health risk soil. These exclusion zones are designated with caution barrier tape that would require stepping over or under in order for a person to willfully trespass into a site. Further, health and safety oversight practices actively and

continually assess who is on the NPL project sites. Trespass into a site by an unescorted or unapproved individual would be noticed and corrected.

Alteration of Groundwater Flow

(21) The Sierra Club disagreed with the proposal to delete areas of groundwater under RMA. The Sierra Club did not believe that the groundwater proposed for deletion in the Internal Parcel has been properly modeled or evaluated, and that deletion could allow aquifer extraction that could alter groundwater flow to the boundary treatment facilities.

EPA Response: The RMA groundwater remedy was selected based on an evaluation of flow and chemical data that included flow modeling. Any groundwater extraction within the deletion areas would be for limited, intermittent refuge use and too low in volume to have any impact on the flow to the boundary treatment systems. The existing extraction wells in the eastern portion of the RMA are low volume agricultural wells. Extraction of groundwater within the Internal Parcel is, and would be, required to be consistent with the remedy, which requires containment of the contaminated groundwater plumes at the RMA boundary. Section 2(a)(2) of the *Refuge Act* (1992) states:

> The management of the property by the Secretary of the Interior shall be subject to (A) any response action at the Arsenal carried out by or under the authority of the Secretary of the Army under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. 9601 et seq.) and other applicable provisions of law, …

In addition, any new groundwater wells would be subject to stringent controls by the Colorado Water Courts and the State Engineers Office to ensure that existing streamflows and existing groundwater uses are not impacted. Groundwater monitoring wells within the Internal Parcel are identified in the *LTMP*. The Army will continue to conduct water level monitoring in these wells to assess any changes in flow directions.

D: ADDITIONAL COMMENTS AND QUESTIONS RECEIVED REGARDING THE RMA/NPL SITE

Sand Creek Lateral

(22) The SSAB expressed concerns that additional contamination was discovered at the SCL and Basin B Drainage Ditch and that this contamination adds uncertainty to the characterization of the area.

EPA Response: The history regarding the discovery of additional contamination at the Sand Creek Lateral is contained in the *Miscellaneous Southern Tier Soils Remediation Project, Sand Creek Lateral, Additional Human Health Exceedance Delineation, Final, Sampling and Analysis Plan* (TTFWI 2005). This history states:

> In October 2004, composite surface soil sampling was conducted in Terrestrial Residual Ecological Risk (TRER) Site 2NW-4, located within Section 2 of the RMA site. The purpose of this sampling was to demonstrate that the Biological Advisory Subcommittee (BAS) approved 3-step tilling process would reduce the Hazard Quotient (HQ) to 2 or less, in areas where estimated HQs were believed to be between 2 and 10. Post-tilling sampling was required to demonstrate the risk reduction.
>
> The sampling was conducted in accordance with the Final Residual Risk Soil Concentration Verification SAP Soil Tilling Demonstration Study (TtFW 2004b), which was based on the Residual Risk Soil Concentration Verification SAP (USFWS 2000). TRER Site 2NW-4 was subdivided into six 3-acre parcels as required by the SAP. Five surficial subsamples were collected within each 3-acre parcel, and composited into one sample to represent the 3-acre parcel. Samples were analyzed on-post at the Environmental Analytical Laboratory (EAL) for low level aldrin and dieldrin.
>
> Results of the analysis indicated acute and chronic Human Health Site Evaluation Criteria (HH SEC) exceedances in two of the six parcels in TRER site 2NW-4. In addition, two other parcels exhibited residual ecological risk that is considered unacceptable (HQ>2). Additional sampling was conducted under the Contingent Soil Volume (CSV) SAP (RVO [Remediation Venture Office] 2003) in November 2004 for the purpose of providing data from discrete sample locations to delineate the HHE soils in TRER Site 2NW-4. A total of 36 discrete soils were collected from TRER Site 2NW-4. Results of this sampling event indicated that the highest concentrations of aldrin/dieldrin were located

> immediately adjacent to the bank of the Sand Creek Lateral. . . . As sample locations moved outward in bands, concentrations correspondingly decreased from HHE levels, to biota levels, to non-detect.
>
> Historic aerial photographs were reviewed to try and identify the activity which may have caused the bank contamination which had been overlooked in the prior remedy effort. Review of historic photos identified what appeared to be prior dredging activities along the SCL. It is hypothesized that these dredging operations were a maintenance action for the lateral, however, there are no written documentation of this action taking place. Subsequent aerial photographs indicate that after lateral material was dredged and deposited on the banks, the areas were graded. There is no record as to whether any of this dredged material was removed prior to grading or if all of it was graded along the lateral.
>
> Photographs from 1954 and 1965 provided the most comprehensive evidence of dredging and grading activities and were used for sample location placement. Piles of what appear to be dredged material are visible along the banks of the lateral in the 1954 photograph, and grading of this material is evident in subsequent photographs, particularly one taken in 1965. These photographs were used to aid in the placement of sample points for Phase 1 of sampling. In order to have a higher likelihood of locating contamination, areas along the SCL that have already undergone remedy removal actions were not selected for sampling. Results from the phase 1 sampling event will provide data that will be used to identify additional sampling locations for final contamination delineation purposes. [Note that although this history does not discuss SAR Site NCSA-5b (Basin B Drainage Ditch), this ditch had similar history and NCSA-5b was included as part of the sampling program for the Sand Creek Lateral.]

The Remedial Investigation included several transects of the Sand Creek Lateral designed to assess the horizontal extent of contamination. The results are contained in the *Final, Phase II Data Addendum, Site 2-1, Drainage Ditches* (1988), *Final Phase II Data Addendum, Site 35-4: Drainage Ditches* (1988), and *Final Phase II Data Addendum, Section 35 – Nonsource Area* (1988). However, with the exception of a transect where the South Plants central tributary ditches discharged into the Sand Creek Lateral, the samples on the banks did not show evidence of HHE contamination.

Remediation of the original Sand Creek Lateral occurred in 1999. During remediation, over 100 confirmatory samples were collected from the ditch. These confirmatory samples were primarily located within the ditch, but samples were also collected from the banks of the Sand Creek Lateral in the vicinity of TRER Site 2NW-4. Several samples

exhibited concentrations of COCs in excess of HHE levels. CSV was excavated in response to these exceedances. Further confirmatory samples were collected and CSV excavated until the results of the soil samples were below exceedance levels. The locations of these confirmatory samples appeared to define the horizontal and vertical extent of contamination.

Without the benefit of the current aerial photographic library that was not nearly as complete at the time of the *ROD*, and in the absence of written documentation of dredging activities, the RI results did not provide evidence to suggest that the banks were contaminated. In addition, during the original remediation, confirmatory samples collected from the final excavated surface had concentrations less than exceedance levels, which provided no reason to believe that the banks of the Sand Creek Lateral were contaminated beyond what had been excavated as CSV.

As previously indicated, limited historical information exists documenting the manufacturing and waste disposal practices at RMA. CERCLA recognizes that the technical understanding of a site will continue to mature throughout the investigation(s) and during actual remediation. This is especially true at more complicated sites and sites with a multi-use or long operational history such as the RMA/NPL Site. EPA contemplated this when the *NCP* was promulgated, and required that the RI must "interact" with the FS, the risk assessment, and ARAR analysis so that a protective and legally appropriate remedy approach is selected. EPA also uses a phased response process (e.g., IRAs followed by the final remedy) and OUs to administer complex and dynamic sites. Further, provisions in the *NCP* for incorporating post-ROD modifications to a remedy is a practical acknowledgement that "in-the-field" design or cleanup activities are likely to yield new information for refining the selected remedy.

Based on the new understanding and conceptual site model by which contamination may have been distributed, a review of other ditches within the boundaries considered for deletion was conducted by the Army. An independent review of other ditches within the proposed Internal Parcel area was also conducted by EPA. These reviews identified one other ditch, ditch SSA-2a south of South Plants, as having the potential to have contamination along the banks based on RI sampling results and the appearance of dredging spoils in the aerial photographs. Accordingly, the SSA-2a ditch and banks were not included within the Internal Parcel area and a sampling program for the ditch and

banks is pending. In addition, EPA will be conducting a review of other ditches within the area that remains on the NPL.

Demolition Range Exclusion Zone (DREZ) Burn Pit

(23) The SSAB expressed concern with the characterization of a burn pit within the DREZ. In particular, they were concerned that the soil associated with the burn pit may not have been sampled for metals or explosives.

EPA Response: The "burn pit" is a 6-foot by 6-foot area within Section 29. The burn pit was approximately 3 feet in depth. The burn pit was identified through the geophysical survey and anomaly clearance activities being conducted at the DREZ. No MEC was found in the pit, although the pit did contain munitions debris related primarily to M69/M74 incendiary bombs.

The soil from the burn pit was sampled at depths of 0.5 feet, 1.5 feet, and 3.5 feet for SVOCs and VOCs. The SVOC suite by EPA Method 8270 included polynuclear aromatics, OCPs, explosive-related compounds, organophosphorous compounds, and organosulfur compounds. The explosive-related compounds included dinitrotoluene, nitrobenzene, and nitrophenols. Preliminary results were less than detection limits. It should be noted that although Solid Waste (SW)-846 Method 8270 identifies nitrotoluenes, nitrobenzene, and nitrophenols as compounds that can be determined by the method, the preferred method of analysis for explosives is by SW-846 Method 8330. Preliminary results of the VOC analyses were also less than detectable limits.

Although the Army did not sample this particular pit for metals, the clearance in this area is not yet complete. The *ROD* limitation is specific for *confirmatory* sampling and does not limit the number of *characterization* samples collected.

In addition, as discussed in the *Technical Memorandum*, results of over 35 confirmatory samples collected at burn and munitions debris areas within the Internal Parcel and analyzed for metals did not result in the identification of any HHE soil. As with all remediation areas, EPA will consider collection of confirmatory samples at this site prior to project completion.